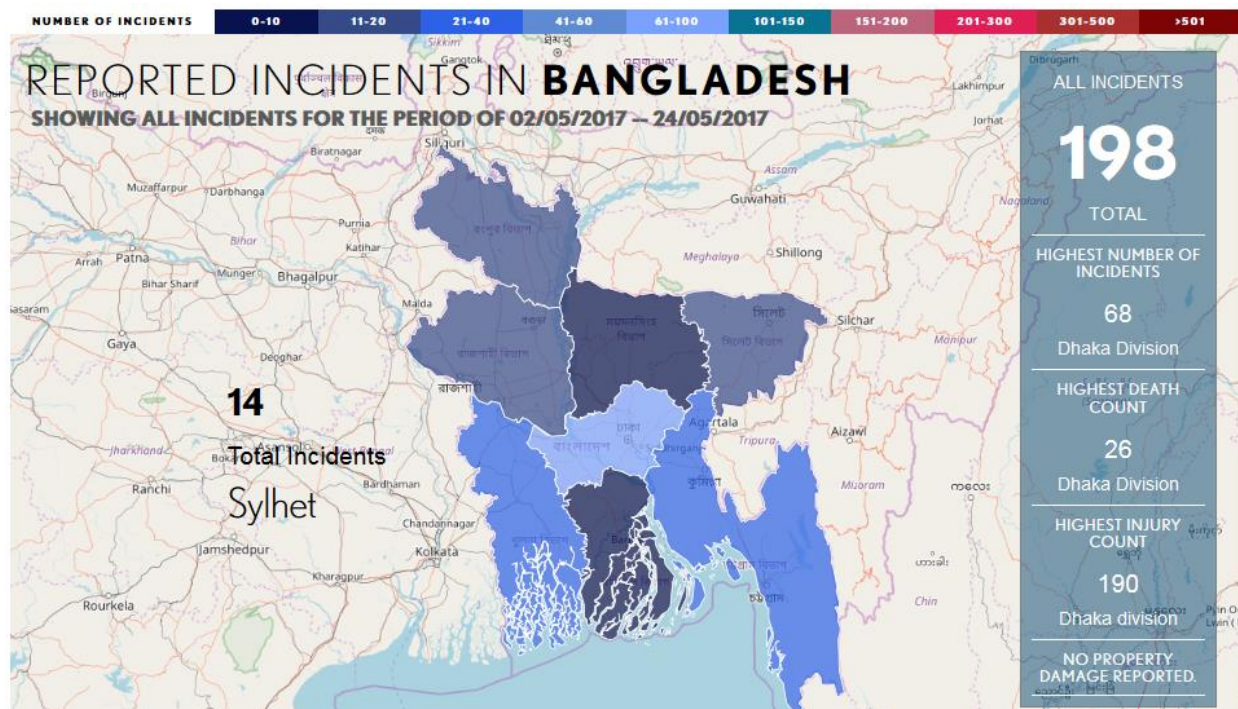


Bangladesh Peace Observatory Data Collection



Team Members

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Abstract

As a part of real world case project for the executive decision-making course, this case presents the decision-making process for selecting the appropriate data collection methods for Bangladesh Peace Observatory in Bangladesh. The Bangladesh Peace Observatory is a virtual platform equipped with mapping and data analytics technology that informs users on the state of violence – political, ethnic, communal, criminal, gender-based, as well as extremist – and other forms of discord in terms of time, space and themes. In this report, tried to identified possible alternatives from which possible courses of action can be taken. At the same time we identified some objectives that they organization wish to attain. By doing pairwise comparison in Riskion, we found that in-house data collection is the best possible course of action. We informed the BPO project team about our result. It is likely that they will take the decision by January 2019, and they will choose this alternative.

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1. Introduction

The Bangladesh Peace Observatory is a virtual platform equipped with mapping and data analytics technology that informs users on the state of violence – political, ethnic, communal, criminal, gender-based, as well as extremist – and other forms of discord in terms of time, space and themes (www.peaceobservatory-cgs.org, 2017).

The aim of the Peace Observatory is to fill the knowledge gap that has been so far restricting public institutions, civil society, academia, media and development agencies from effectively discussing and addressing the obstacles to peace. The Peace Observatory is working on the principle of “open data” as a platform freely available to everyone to use without restrictions, aiming at advancing knowledge, and understanding of peace and development in Bangladesh. The Bangladesh Peace Observatory Facility is part of a larger initiative “Partnerships for a Tolerant, Inclusive Bangladesh,” carried by the United Nations Development Program (UNDP) in Bangladesh (www.peaceobservatory-cgs.org, 2017).

In this pursuit of peace as a peace observer, the most important elements are the reliability and validity of the data to be collected. This is a strategic decision as it can impact the observatory at organization level. The issue is how to collect the data to ensure that the data collected is authentic, reliable, and valid as well as collection method is cost effective.

2. Decision making methods and tools

There are many decision making method and tools available for this type of decision making. Some of them are as follows:

2.1. Weights and Score

Factor rating is a procedure or technique to evaluate multiple alternatives based on a number of selected factors. It allows decision makers to include qualitative information (their opinions) and quantitative information while providing a rational basis of comparison based on factor rating by establishing a value for each option that encompasses all factors. In simple words, it is process which assigns a numerical factor, to the each attribute of options, based on available information and then chooses the option with greatest composite value.

However, this method is very inefficient if people don't understand their preferences very well and fail to assign weights accurately.

2.2. Multi Attribute Utility Theory (MAUT)

MAUT is a decision making methodology based on the utility of the decision and preferences. It is designed to handle the tradeoffs among multiple objectives. However, this method is difficult to apply as deriving the weights for objectives and sub-objectives is very difficult.

2.3. Analytic Hierarchy Process (AHP)

AHP is an analytical process of making a choice based on hierarchical composition (Foreman, 2017). This involved dividing the decision in sub-decisions and further dividing the sub-decisions into lower level objectives. It allows decision makers to model a complex problem in a hierarchical structure showing the relationships of the goal, objectives (criteria), sub-objectives, and alternatives (Forman, 2017)

This method is very efficient and comparatively simpler to apply. AHP helps in judging, via pair-wise comparisons, the relative importance of the objectives and the preference for the alternatives that one has defined. It also helps in deriving the priorities by combining intangible information and experiences which in turn helps to include the different viewpoints. It also allows using both top-down and bottom-up approach of decision making which further simplifies the decision analysis process (Forman, 2017).

AHP is selected as decision making method due to its efficiency, simplicity and its ability to judge the relative importance of the objectives.

3. Participants and Their Roles

Participants are the people that take part in the decision-making process and can affect the final decision. The ability to affect the decision depends on the role they play in the decision making process. For this project the participants and their roles are shown in the table below:

1. **UNDP** – United nation development program is the supporter of the program. It helps in financing the project and provides administrative, advisor and legal support to the program. It will play a role of reviewer of the decision. This involves comparing the decision and options in the basis of established policies of the UNDP charter.

| <input type="checkbox"/> | Email Address | Participant Name | Permission |
|--------------------------|--|--|-----------------|
| <input type="checkbox"/> | delwardu@gmail.com | Delwar Hossain | Evaluator |
| <input type="checkbox"/> | taufiq733ir@gmail.com | Hossain Ahmed Taufiq, Research Manager BPO | Evaluator |
| <input type="checkbox"/> | hkshamimdu@gmail.com | Humaun Kabir, Project Officer | Evaluator |
| <input type="checkbox"/> | huwayza@gwu.edu | Huwayza Alqahtani | Project Manager |
| <input type="checkbox"/> | forman@gwu.edu | Professor Forman | Project Manager |
| <input type="checkbox"/> | smahzabeen@gwu.edu | Shakira Mahzabeen | Project Manager |
| <input type="checkbox"/> | shidarthogoushami@undp.com | Shidartho Goushami, Program Associate | Evaluator |

Figure 1: Showing participants' Information

2. **Project team** – The project team play critical role in the decision making by playing a role that involved developing the alternative, objective, assessing them and drafting the final recommendations.
3. **Director** – The director is to pay the role of executive decision maker for making the final decision based on the recommendations submitted.
4. **Newspaper Authorities** – Newspaper authorities play a role of advisor. They provide their advice on the decision alternatives. They also play a role of data provider and incident reporting in the program.
5. **Law enforcement agencies** - Law enforcement agencies play a role of advisor. They provide their advice on the decision alternatives. They also play a role of data provider and incident reporting in the program.
6. **Public and private organizations** - Public and private organizations play a role of suggestions provider. They provide their inputs on the decision alternatives. They also play a role of data provider and incident reporting in the program.

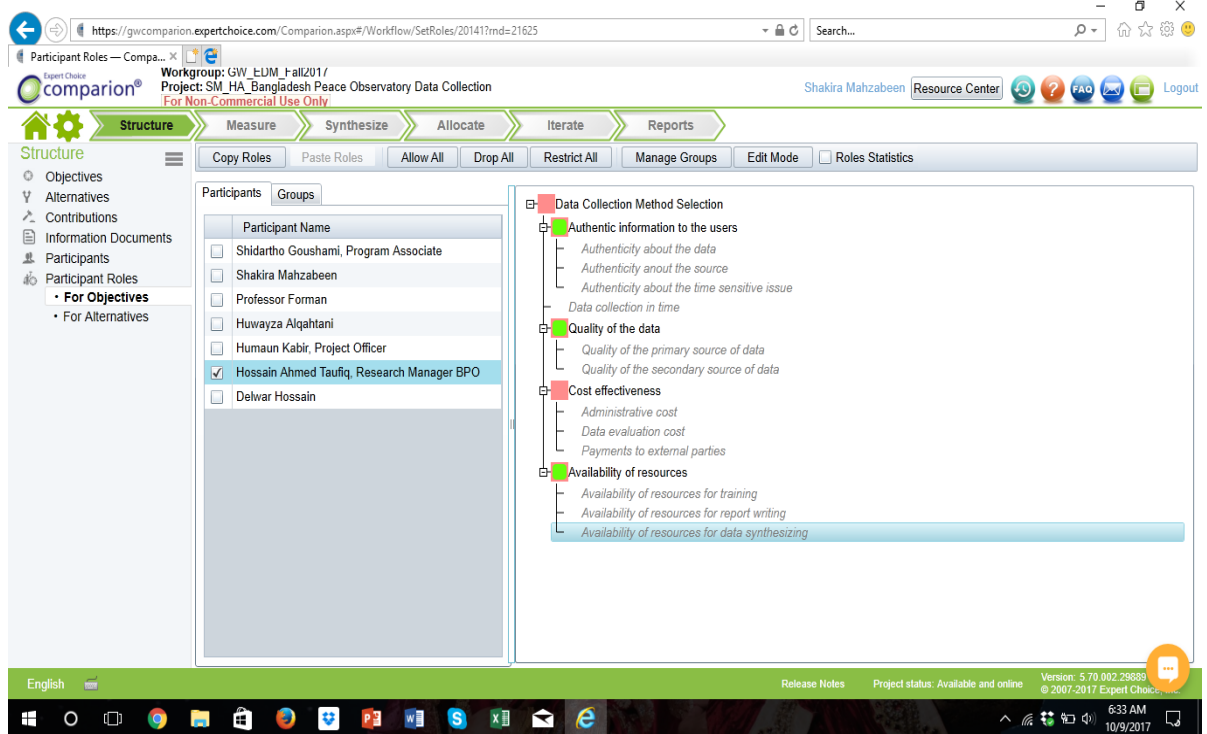


Figure 1: Showing participants' Roles

4. Developing the Alternatives

The alternatives were developed based on the suggestions from the advisors, management and after accessing the requirements and current ground situation in the state of Bangladesh. This top-down approach is used by keeping the organizational strategy in mind. The alternatives developed are as follows:

1. **In-house collection of data:** The most suggested alternative developed is to collect the data using in-house. This involves setting own project team to collect, validate and report the data. This will include hiring the team as well as managing them to ensure availability of resources. This method ensures authenticity and quality of data. This method also proves to be cost effective and reduces the chances of bias in the data. However setting a project team and collecting the data throughout the country is a time consuming process and takes a lot of manpower.

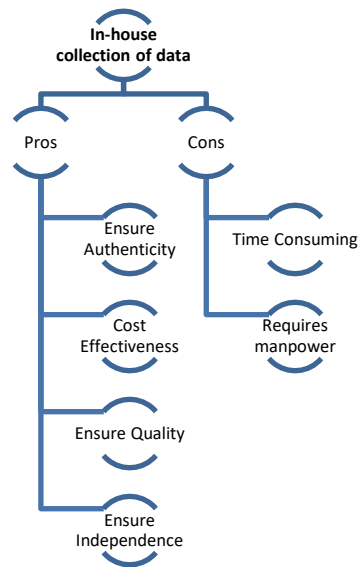


Chart 1: In-house data collection

2. **Outsourcing the data collection process:** Another alternative is to outsource the data collection process to a third-party data collector agency. This method will reduce the man-power requirement and will result in considerable saving of the valuable time. However, this method will prove costly and will create risk of data inconsistency. This method will create a risk for the quality of data as data quality will remain dependent on the efforts of the other parties.

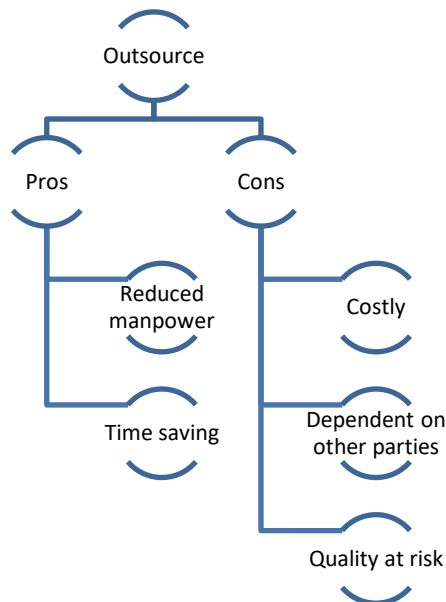


Chart 2: Outsourcing

| Unique ID | | Alternatives |
|-----------|---|---|
| [1] | i | In-house data collection |
| [2] | i | Outsourcing |
| [3] | i | Combination of in-house and outsource based on priority |

Figure 2: Showing Possible Alternatives

3. **Using a combination of in-house and outsourcing:** This alternative uses a combination of both in-house and outsourcing. This involves using the outsourcing for data collection along with in-house team based on the priority. This will ensure the quality of data and will reduce the manpower. However, still in this the project success will depend on the efforts of the third party.

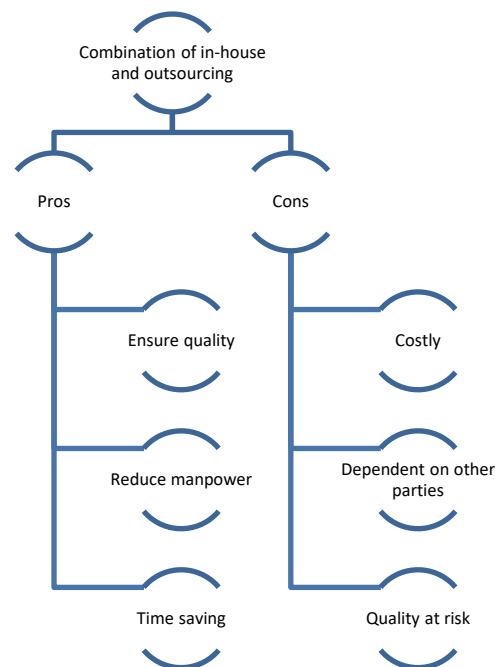


Chart 3: Combination of In-house and Outsourcing

5. Developing the Objectives and Sub-Objectives

Objectives here represent what the organization wants from the project. This forms the basis of taking a rational decision in choosing the optimal alternative (Forman, 2015). The participant used top-down approach to determine the five objectives which are further divided into eleven sub-objectives. The figure below shows the objectives and sub-objectives for the decision.

1. **Providing authentic information to the users:** The most important strategic objective that everyone agreed to is to provide the authentic, reliable, updated and valid information to the user. This objective is further divided into:
 - a. Authenticity of the data collected,
 - b. Authenticity of the source of data,
 - c. Authenticity of the time sensitive issues.

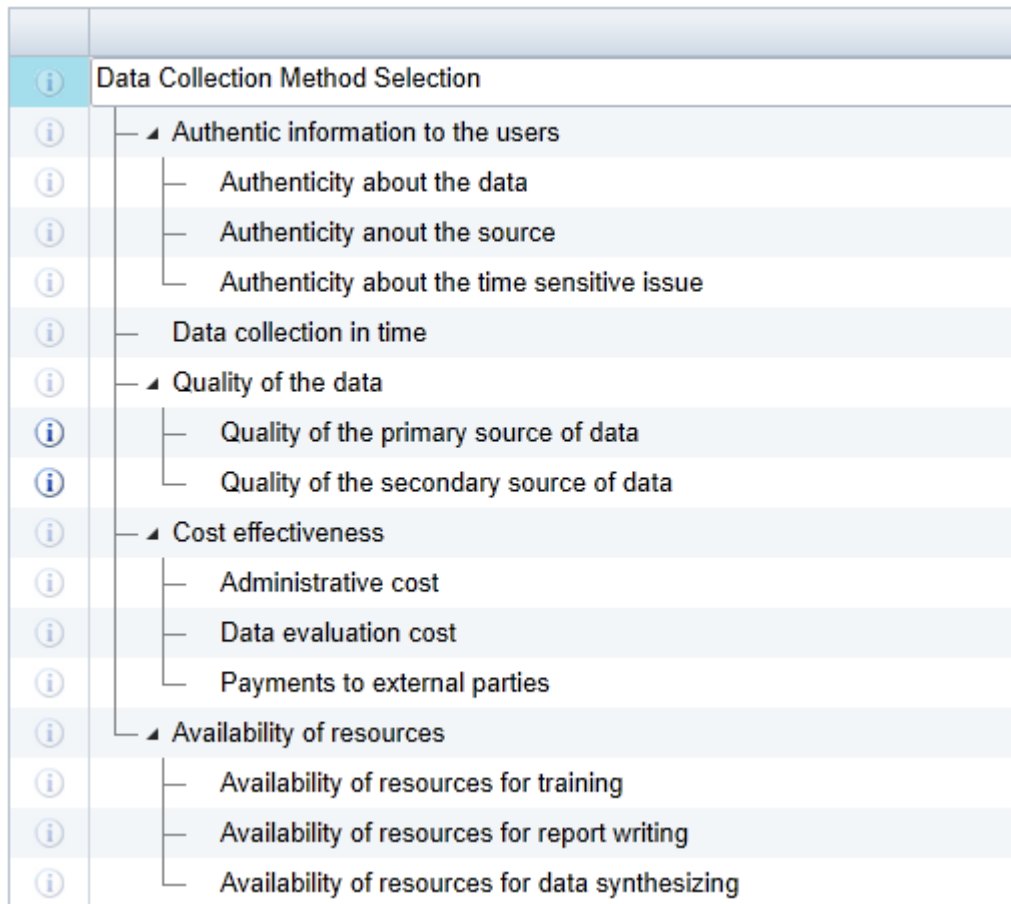


Figure 3: Showing objectives and Sub-objectives

2. **Provide data in a timely manner:** This relates to the reporting time between the occurrence of the incidents and the reporting of the data. It is very important to have a lower lead time in between the reporting and availability of the data on website. There is no use of data if it is not provided in a timely manner. It also reduces the reliability of the program in providing the data.
3. **Ensure quality of the data:** Data quality is data's fitness to serve its aim in a given context. It refers to the accuracy and consistency validity of data over its lifecycle. Data

integrity is maintaining the information intact ensuring data is recorded exactly as intended. Overall the data integrity is to prevent unintentional changes to information. The way data is entered, stored and managed can affect the quality of data. This is further divided into the following sub-objectives:

- a. Quality of the data from primary source,
 - b. Quality of the data from secondary sources.
4. **Reduce cost:** The service provided by the website is a non-value added service. The service is not a paid one but is a service to society to create peace in the reason by providing the information about the incidents.

Hence, it is most important that the data collection should be carried out at a reasonable cost without burdening the organization. This is further divided into the following sub-objectives:

- a. Cost effectiveness of administrative works related to data quality,
 - b. Cost effectiveness of data evaluation methods,
 - c. Payment of external parties.
5. **Ensure man-power availability for the analyzing and visualizing:** Data is a collection of facts and statistics. Information is the arrangement of data in ways that are actually relevant to decision-makers. To make this transition happen it is necessary to have enough man-power availability to carry out this conversion. This is further divided into the following sub-objectives:
- a. Availability of resources of training,
 - b. Availability of resources for report writing,
 - c. Availability of resources for data synthesizing.

6. Model Setup and the Collection of Judgments

A model is created using the Comparison software suite, the above described alternatives, objectives, and sub-objectives, including a short description of each, were inserted into the model. An abstract of the decision to be made was placed in comparison along with an overall goal of data collection.

| Alternatives | Goal | | | | | | | | | | | |
|--|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| | Authentic information to the users | | | Data collection in time | Quality of the data | | Cost effectiveness | | | Availability of resources | | |
| | Authenticity about | Authenticity about | Authenticity about | | Quality of the prim | Quality of the sec | Administrative cot | Data evaluation c | Payments to exte | Availability of resc | Availability of resc | Availability of resc |
| <input checked="" type="checkbox"/> In-house data collection | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> Outsourcing | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> Combination of in-house | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

Figure 4: Showing Model Setup

7. Measurement methods: Collection of inputs

Pairwise data collection method is used for comparing the objectives using the default rating scale. In this the objectives were compared against the project's goal of selecting the suitable data selection method. One of the comparisons comparing "data collection in time" and the "Quality of data is shown below in the figure-5.

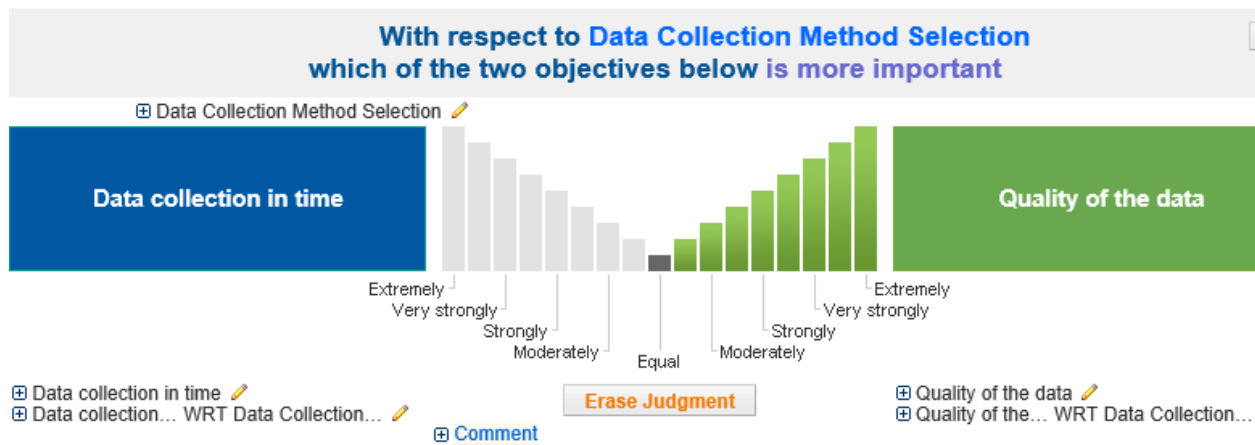


Figure 5: Example of a judgment (pairwise comparison) between two objectives with respect to the model's goal

These pairwise comparisons are then summarized into priority of objectives for participants. One of the summary tables is shown below:

Priority of objectives with respect to "Data Collection Method Selection"

| No ▲ | Name | Participant results | |
|------|------------------------------------|---------------------|-------------|
| 1 | Authentic information to the users | 11.02% | <div></div> |
| 2 | Data collection in time | 4.30% | <div></div> |
| 3 | Quality of the data | 58.20% | <div></div> |
| 4 | Cost effectiveness | 24.39% | <div></div> |
| 5 | Availability of resources | 2.09% | <div></div> |

Inconsistency ratio: 0.41

Figure 6: Priority of objectives with respect to the model's goal

In phase-2 the comparison of alternatives with alternatives is carried out on a rating scale as shown below in figure-7. The completion of these judgments resulted in summary of the results as shown in figure-8

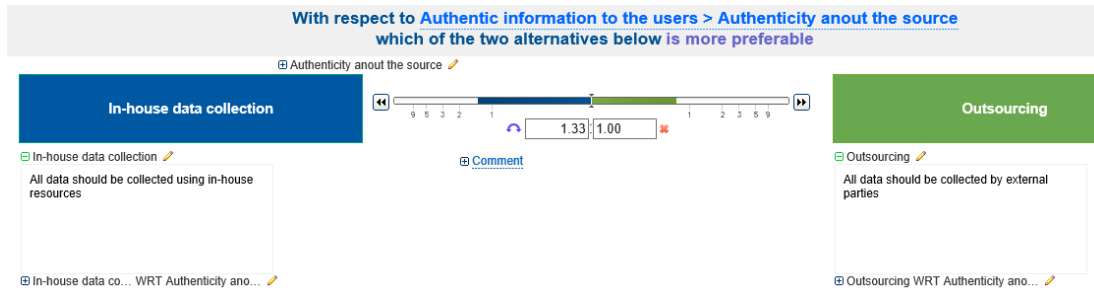


Figure 7: Judgment of two alternatives with respect to authenticity about the source

Priority of alternatives with respect to "Authenticity about the source"

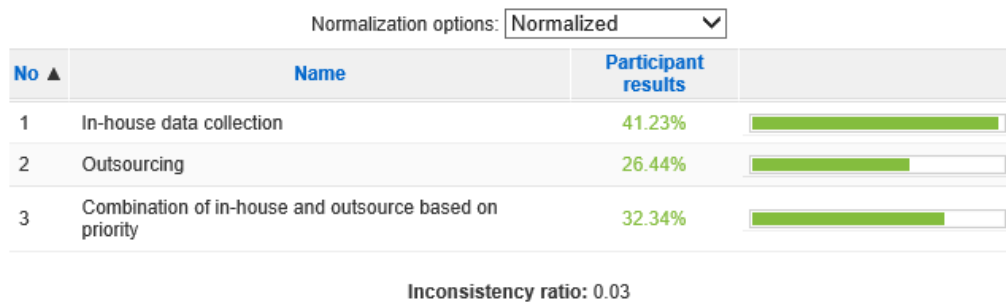


Figure 8: Normalized results for two alternatives

The results of the judgments for the overall measurements are shown below.



Figure 9: Overall normalized results

8. Inconsistency, Bias, and the Decisions

The completion of measurement phase gives the different tables that need further analysis. The objective priorities of all the participants are shown in the table below. The table indicates that the people are fairly indicating similar results in prioritization of objectives. Almost all participants gave preference to quality of data over other objectives. Only one of the

participants gave especial preference to the authenticity of the information over quality of the data.

Objective Priorities

Show children of selected node ▼

| Objectives | Delwar Hossain | Hossain Ahmed | Humaun Kabir, F | Huwayza Alqaht | Shakira Mahzab | Shidartho Goust | [All Participants] 6 with judgments |
|------------------------------------|----------------|---------------|-----------------|----------------|----------------|-----------------|--|
| Authentic information to the users | 4.76% | 18.93% | 18.93% | 11.02% | 57.79% | 18.93% | 18.93% |
| Availability of resources | 1.89% | 3.45% | 3.45% | 2.09% | 4.20% | 3.45% | 3.45% |
| Cost effectiveness | 16.92% | 13.37% | 13.37% | 24.39% | 2.05% | 13.37% | 13.37% |
| Data collection in time | 29.86% | 14.74% | 14.74% | 4.30% | 11.60% | 14.74% | 14.74% |
| Quality of the data | 46.56% | 49.50% | 49.50% | 58.20% | 24.37% | 49.50% | 49.50% |

Figure 10: Objective priorities generated using Comparion

The variation of this magnitude is normal in decision making as not all participants can be made to have similar opinion. The approach and variations is consistent in comparison to generally acceptable variance.

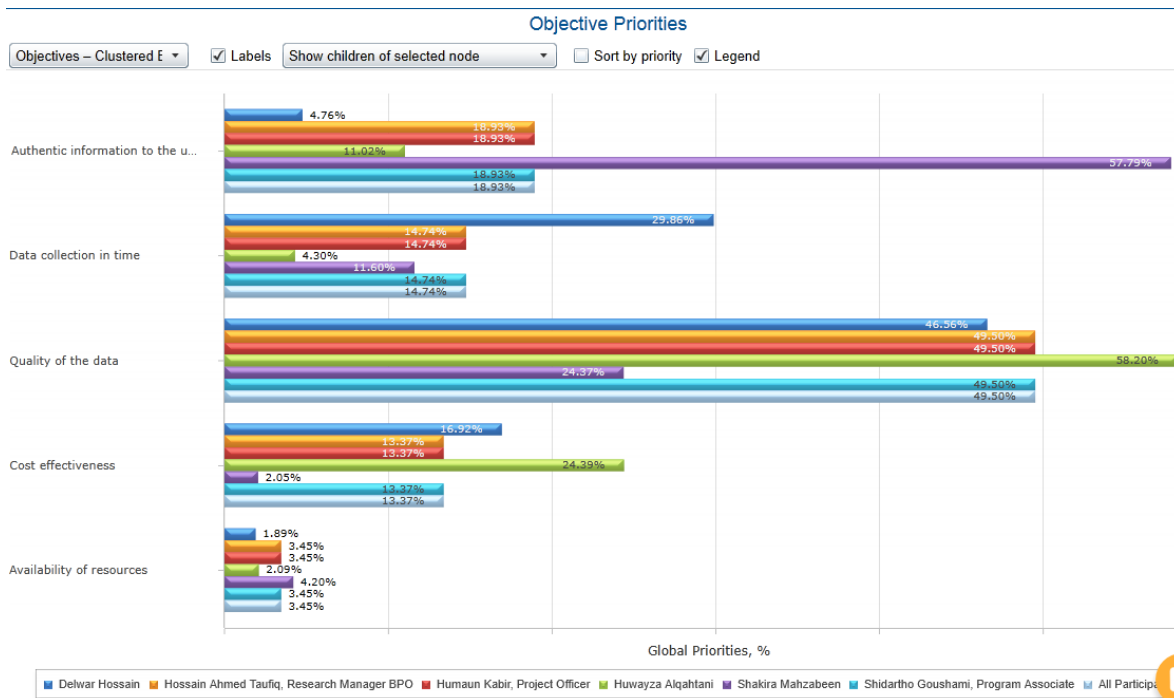


Figure 11: Objectives chart showing graphical representation of individual priorities

9. Sensitivity Analysis

The sensitivity analysis is carried out for each of the participant as well as on the combined data. The comparison of the participants is shown below in the following figure.

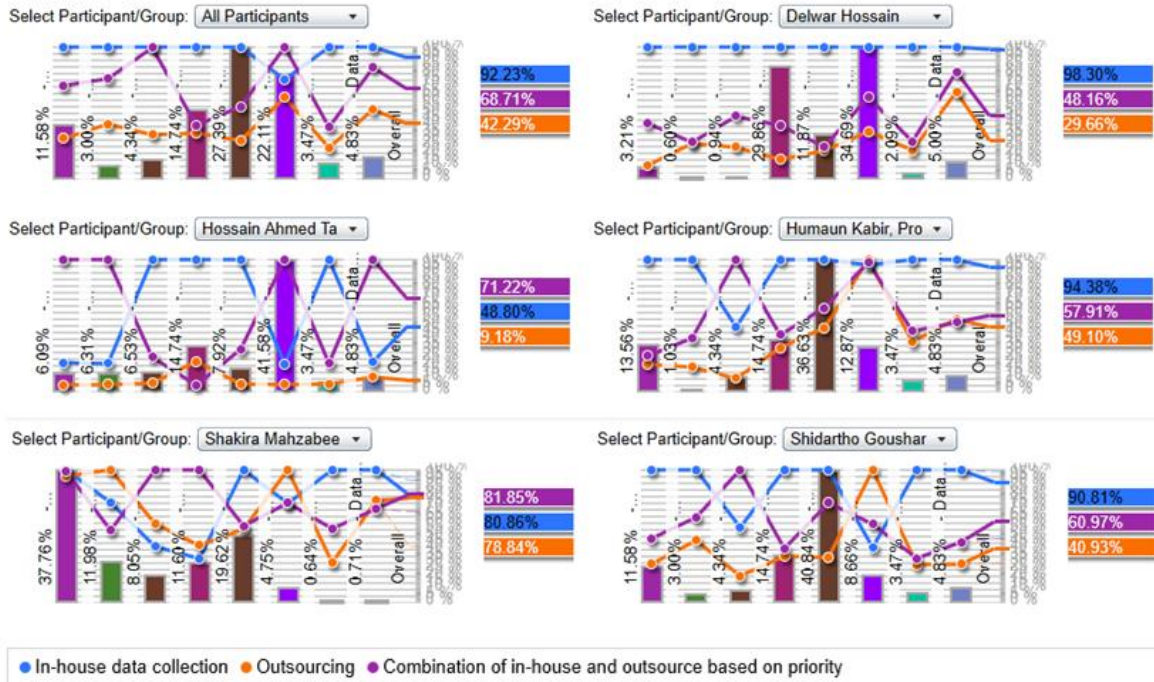


Figure 12: Participant's results of alternative preference for each objective

Appendix-1 shows the level of variance of objectives/Alternative with respect to objective/covering objective. This shows that the maximum level of variance occurring is approximately 8% means a standard deviation of approximately 3%. This shows that the consistency in participant's ratings.

10. Result

The combined results for the for the project in terms of the three alternatives i.e. In-house collection of data, outsourcing the data collection process and using a combination of in-house and outsourcing to collect the data. The results are plotted for each individual in the figure 13. The plot indicates that participants gave preference to the in-house collection of data.

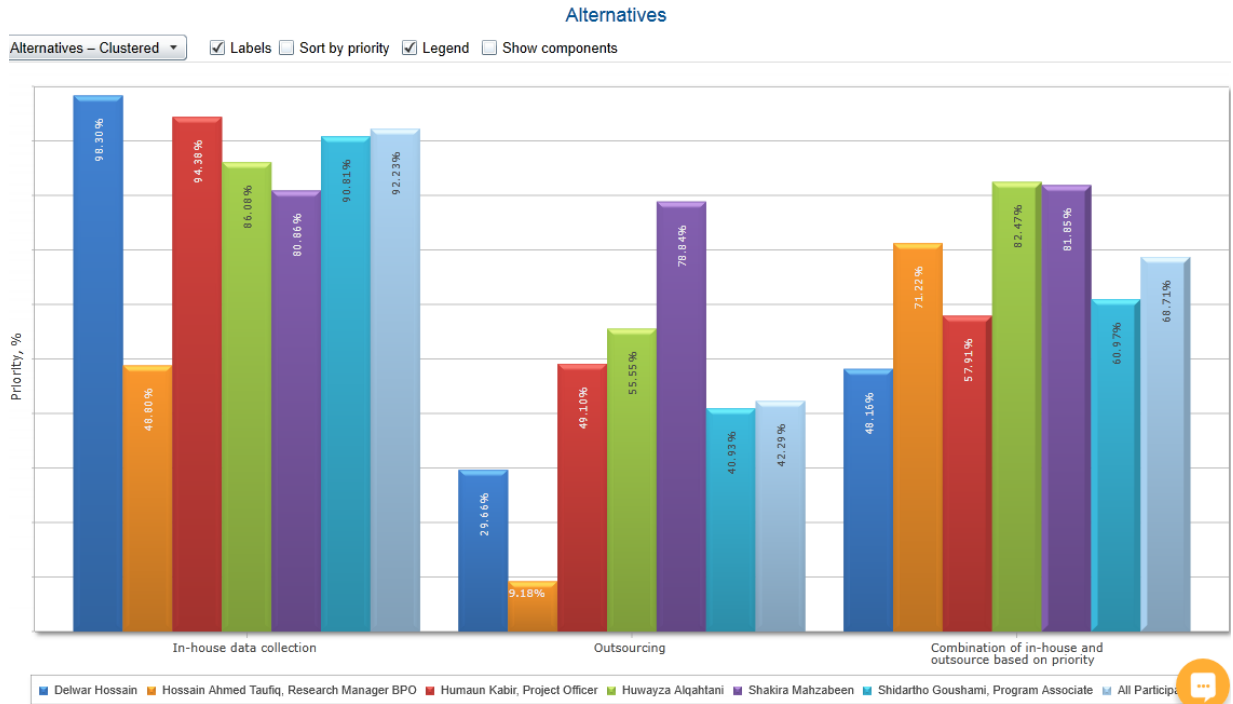


Figure 13: Result report of the comparison for alternatives (Individual wise)

The variation individual preference for in-house data selection method is fairly constant with one outlier which five preferences to the use of combination of in-house and outsourcing for data collection. The premise was based on the reduction of cost rather than the quality of the data collected.

The sensitivity analysis of sub-objectives indicates that for different sub-objectives priorities were different. When it comes to authenticity of the data to the users participants preferred outsource data collection method. The reason behind this could be the idea that in-house data collectors may manipulate the data which will make it less authentic. Although in terms of quality of data, almost all participants believe that in-house data collection method is the best method. From the cost effectiveness perspective, in-house is the best alternative. When it comes to availability of the resources, outsourcing is by far the best alternative.

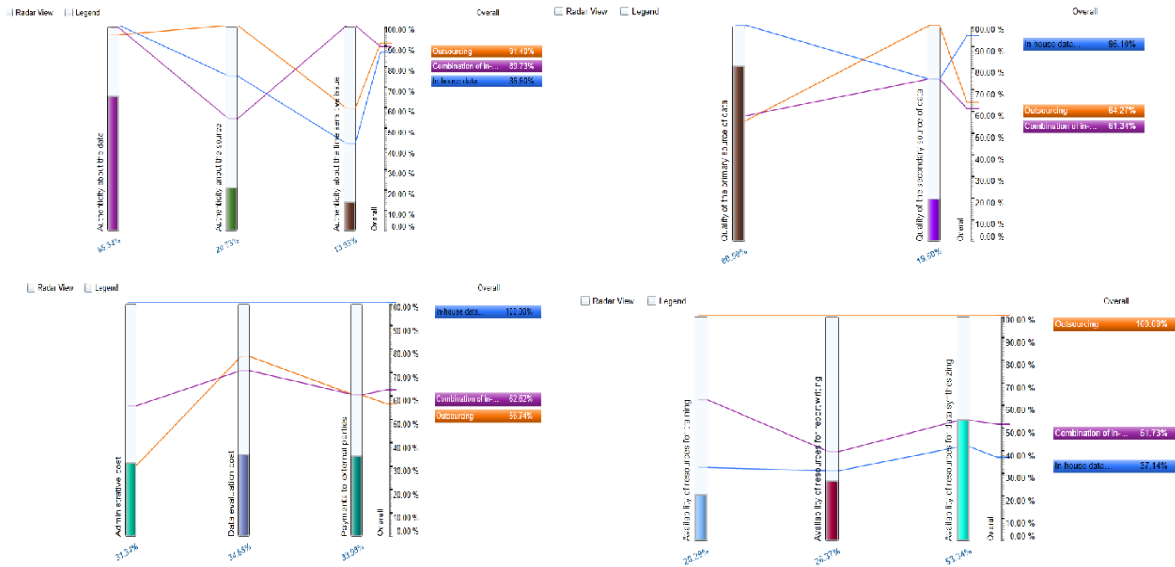


Figure 14: Sensitivity Analysis for sub-objectives

The following figure shows the combined results for making the decision.

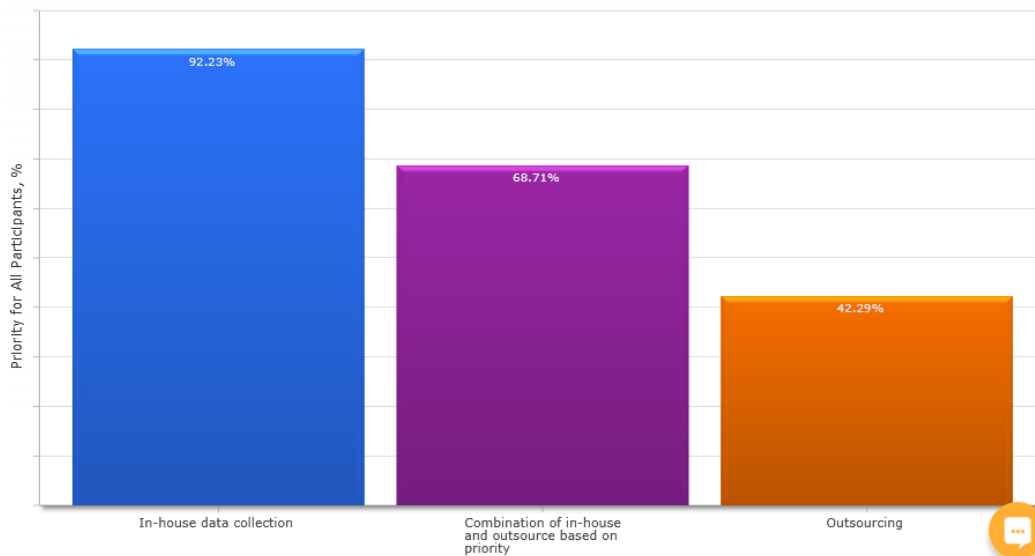


Figure 15: Combined Result

The figure shows that the difference between the three alternatives is considerable:

- In-house is preferred over outsourcing by a whopping 50% absolute difference,
- In-house is preferred over using the combined data collection method by 23% absolute difference,

- Combined data collection method is preferred over outsourcing by 27% absolute difference.
- Outsourcing the data collection method is least preferred method for data collection.

10.Conclusion

This report was based upon a real-world project named “Bangladesh Peace Observatory (BPO) Project”. It is a UNDP funded initiative where it focuses on collecting analyzing crime and crime related issues. The primary objective is to maintain a database so that interested parties can generate crime related information when needed. The focus of our project was to make a decision model so regarding the data collection method so that the concerned authority can make a better decision.

With the help of the project manager of BPO, we first established the alternatives with pros and cons of each alternative. Then we identified the objectives that they project team wish to attain. Based on the objectives we tried to measure which alternative is best suitable. We used pairwise comparison for the measurement purpose. Then we invited the decision-making participants to provide their evaluation.

Based on their evaluation it is found that the preferred decision is to select the in-house data collection method for collecting the data. However, when considered the sub-objectives, it was found that different alternatives were preferable for different sub-objectives. We informed our result to the BPO team. They said that they are planning to implement the in-house data collection method. The result is in line with the organizational objective of providing the quality and accurate data to its users.

References

Forman, E. (2010). The Analytic Hierarchy Process and Expert Choice. [PDF document].

Retrieved 3 October 2017, from

<http://professorforman.com/DecisionByObjectives/Chapter4.PDF>

Appendix-1

| Rank | Objective / Alternative | With respect to: Objective / Covering Objective | Variance, % | Step # |
|------|---|---|-------------|--------|
| 1 | Outsourcing | Availability of resources for training | 8.19 | 63 |
| 2 | In-house data collection | Availability of resources for training | 7.79 | 63 |
| 3 | Outsourcing | Availability of resources for data synthesizing | 7.09 | 71 |
| 4 | Quality of the secondary source of data | Quality of the data | 6.78 | 17 |
| 5 | Quality of the primary source of data | Quality of the data | 6.78 | 17 |
| 6 | In-house data collection | Availability of resources for report writing | 6.1 | 67 |
| 7 | Combination of in-house and outsource based on priority | Availability of resources for data synthesizing | 5.61 | 72 |
| 8 | Authentic information to the users | Data Collection Method Selection | 5.6 | 2 |
| 9 | Combination of in-house and outsource based on priority | Payments to external parties | 4.77 | 60 |
| 10 | Combination of in-house and outsource based on priority | Authenticity about the data | 4.72 | 28 |
| 11 | Combination of in-house and outsource based on priority | Authenticity about the source | 4.56 | 32 |
| 12 | Outsourcing | Availability of resources for report writing | 4.43 | 67 |
| 13 | Combination of in-house and outsource based on priority | Data evaluation cost | 3.48 | 56 |
| 14 | Combination of in-house and outsource based on priority | Quality of the secondary source of data | 3.39 | 48 |
| 15 | In-house data collection | Authenticity about the data | 3.26 | 27 |
| 16 | Payments to external parties | Cost effectiveness | 3.04 | 20 |
| 17 | In-house data collection | Authenticity about the time sensitive issue | 3 | 35 |
| 18 | In-house data collection | Authenticity about the source | 2.95 | 31 |
| 19 | Combination of in-house and outsource based on priority | Authenticity about the time sensitive issue | 2.77 | 36 |
| 20 | Authenticity about the data | Authentic information to the users | 2.41 | 13 |
| 21 | In-house data collection | Payments to external parties | 2.39 | 59 |
| 22 | Outsourcing | Quality of the secondary source of data | 2.29 | 47 |
| 23 | In-house data collection | Quality of the primary source of data | 1.88 | 43 |
| 24 | In-house data collection | Data evaluation cost | 1.8 | 55 |
| 25 | Administrative cost | Cost effectiveness | 1.64 | 19 |
| 26 | In-house data collection | Quality of the secondary source of data | 1.37 | 47 |
| 27 | Availability of resources for training | Availability of resources | 1.18 | 23 |
| 28 | In-house data collection | Administrative cost | 1.12 | 51 |
| 29 | Authenticity about the source | Authentic information to the users | 1.05 | 13 |
| 30 | Combination of in-house and outsource based on priority | Data collection in time | 1 | 40 |
| 31 | Combination of in-house and outsource based on priority | Quality of the primary source of data | 0.98 | 44 |
| 32 | Outsourcing | Authenticity about the time sensitive issue | 0.82 | 35 |
| 33 | In-house data collection | Data collection in time | 0.77 | 39 |
| 34 | Outsourcing | Authenticity about the data | 0.63 | 27 |
| 35 | Outsourcing | Authenticity about the source | 0.60 | 31 |
| 36 | Outsourcing | Payments to external parties | 0.54 | 59 |
| 37 | Outsourcing | Data evaluation cost | 0.52 | 55 |
| 38 | Availability of resources for report writing | Availability of resources | 0.52 | 23 |
| 39 | Combination of in-house and outsource based on priority | Availability of resources for report writing | 0.48 | 68 |
| 40 | Outsourcing | Quality of the primary source of data | 0.37 | 43 |
| 41 | Authenticity about the time sensitive issue | Authentic information to the users | 0.33 | 14 |
| 42 | Outsourcing | Administrative cost | 0.33 | 51 |
| 43 | Combination of in-house and outsource based on priority | Administrative cost | 0.32 | 52 |
| 44 | In-house data collection | Availability of resources for data synthesizing | 0.27 | 71 |
| 45 | Data evaluation cost | Cost effectiveness | 0.21 | 19 |
| 46 | Outsourcing | Data collection in time | 0.17 | 39 |
| 47 | Availability of resources for data synthesizing | Availability of resources | 0.14 | 24 |
| 48 | Combination of in-house and outsource based on priority | Availability of resources for training | 0.10 | 64 |

Consensus View